File 99 7464

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ELEVENTH MONTHLY NARRATIVE REPORT

15 June 1965

REFERENCE

STAT Contract

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Declass Review by NGA.

REPORTING INTERVAL

10 May 1965 - 10 June 1965

OBJECTIVE

The objective of this program is the design, construction, and testing of a prenormalizing system to be used for problems of automatic target identification on aerial imagery. The prenormalizer will scan the image and, by special filtering techniques, produce a set of measurements which have minimal change with translation and rotation of the specific image on the scene. Testing is to be accomplished on the CONFLEX I Adaptive Recognition System.

STATUS OF ACTIVITIES AND ACCOMPLISHMENTS

During the past reporting interval, the majority of time has been spent gathering experimental data on the prenormalizing system and taking whatever steps have been necessary to improve the system performance. The work in the past interval may best be summed up in a pair of experiments which have been conducted a number of times during the system adjustment process. These two experiments consisted of a test with simulated railyard imagery and a test using residential housing

developments and airport runways on actual aerial photography.

In the first experiment, six examples of simulated railyard imagery were trained individually in six classes on the CONFLEX System. Each of the six was taught in a standard position. During the test, each test scene was presented in nine positions, each position corresponding to a multiple of five degrees rotation from the standard position. The image was thus rotated from the zero degree position to a position 45 degrees from the position used during training. Despite the fact that all six images were quite similar, the system response was correct in all but three of the 54 test positions. The errors were due to the noise in the video sampling which does not precess along with the sequence of video signals as the image is rotated.

In the second experiment, thirty-four slides of aerial photography were collected; twenty slides represented airport runways and fourteen represented residential housing developments. Five slides of each class were used to program the CONFLEX System and all thirty-four slides were then tested in the recognition mode. No errors in classification were made for any of the thirty-four slides which were tested in each of four orientations at 90 degree intervals. In other words, a total of 136 unknowns were tested and all were correctly classified.

Since the last reporting interval, the principal change made in the system was the modification to the analog gate bias supply voltage. The primary source of noise in the system is the transient effect introduced by eight hundred switching

gates. It was discovered that a substantial reduction in noise could be made if the gates were not sharply driven to cutoff. A reduction in the bias voltage supply met this condition and enabled the reported results to be obtained. Although some time was spent adjusting optical parameters, the transient effects caused by sample slits moving on and off the field remained as one source of noise in the system. Further comments on problem areas are given in a later paragraph.

TIME SPENT ON PROJECT (CUMULATIVE TOTAL)

STAT [redacted] 235 Hours

658 Hours

TECHNICAL AGREEMENTS MADE

None

DIFFICULTIES ENCOUNTERED

At the close of this reporting interval, we still lacked the photography needed for an adequate data base. This problem is to be alleviated somewhat by the results of our current darkroom efforts to use the photography on hand.

Our greatest difficulty has resulted from the failure of the CONFLEX Memory System which took place near the end of this reporting interval. The memory disc has been returned to the manufacturer for repair, but further testing is impossible until it is returned.

PROGRAM FOR THE NEXT INTERVAL

During this, the last reporting interval, the principal effort will be devoted to preparation of the final technical report. A copy of the report covering the results of the entire twelve-month research and development effort will be made available before the contract period is over.

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SUBMITTED

Project Engineer

Director of Engineering